Zero Retries issue 0034 2022-02-25

Advanced Amateur Radio - Data Communications; Space; Microwave… the fun stuff! The Universal Purpose of Ham Radio is to have fun messing around with radios - Bob Witte K0NR. Ultimately, amateur radio must prove that it is useful for society - Dr. Karl Meinzer DJ4ZC. We are confronted by insurmountable opportunities! - Pogo. Nothing great has ever been accomplished without irrational exuberance - Tom Evslin. Irrational exuberance is pretty much the business model of Zero Retries Newsletter - Steve Stroh N8GNJ.

Steve Stroh N8GNJ, Editor

Jack Stroh, Late Night Assistant Editor

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Request To Send

Countdown to Hamvention 2022 - May 20-22, in Xenia, Ohio - 12 weeks…

In Zero Retries 0033, I said:

> I've decided to internalize this summer's Amateur Radio activities as a memorial not just for WB4APR, but also for some dear friends that are also Silent Keyboards: Richard Ball N7RIG, Bob King K7OFT, Bob Donnell KD7NM, and Don Werts N7NKJ.

In that sad list that is an inspiration to *get things done*, I should have included my friend Scott Slack KB7VBS as a Silent Keyboard, who was a victim of the early wave of COVID-19. Scott

became a special friend after we spent one memorable Saturday afternoon years ago in the lower level of my former home with Scott trying to teach me the rudiments of the C programming language. Although the lesson didn't take (*pointers! strings!*), we had so much fun that afternoon that it was inspiration for the possibilities of having a space large enough to share with friends to work on projects. That memory influenced my wife Tina KD7WSF's and my choice of a new home in Bellingham to include space to support such activities. If COVID-19 had not been such a dominant issue, **N8GNJ Labs** would have thrown open its doors last Summer for shared radio fun. In Summer 2022, there *will* be much shared radio fun!

Administrivia: Although I enjoyed Chris Sullivan VE3RNT's comments on past issues of Zero Retries, I realized that leaving commenting open indefinitely could be an issue as there's no authentication required for comments. If someone with nefarious intent started commenting on every past issue of Zero Retries, it would be a lot of work to clean up. Thus my new policy is that commenting will be open on the five most current issues of Zero Retries. As of this issue, commenting is only open on Zero Retries 0029 and later. As I publish a new issue, I'll disable comments from the sixth most recent issue. I've suggested that Substack add an "auto-close comments" feature.

de N8GNJ

The Ultimate Software Defined (Mostly Data) Radio

This was the second "Squirrel!" that occurred a couple of weeks ago that I referred to in Zero Retries 0033, but there wasn't space for this article.

I got this casual email from my friend Peter Dahl WA7FUS:

> Have you looked at the Flex 6400M with a Q5 Signal (5 band) multiband 25 watt transverter to give you a SDR radio for HF plus 2m, 220, 70cm, 900, and 1.2? It's only $'s. Then to make it an even more super radio you control it with SmartSDR MAC.
> I am getting serious about purchasing a 6400M and having a 5 band Hex Beam antenna installed here in Brier. As of now I am not ready to think about the addition of a transverter for they higher bands but Michael Walker of Flex sure is enthusiastically promoting the use of the Q5 Signal with his Flex radios.

WA7FUS has now placed his order for a FlexRadio 6400M.

Q5 Signal 5BVUXHP 5-Band High Power VHF/UHF Transverter (front) - Image courtesy of Q5 Signal

Q5 Signal 5BVUXHP 5-Band High Power VHF/UHF Transverter (rear) - Image courtesy of Q5 Signal

I remember thinking at the time (but apparently didn't share it with WA7FUS) *One Radio - To Rule Them All* (oblique reference to "The One Ring" in Lord of the Rings).

Wow… just… Wow. What an *elegant* and functional piece of engineering! For some context, flash back to Zero Retries 0007 where I was discussing "New Paradigm Network Amateur Radios", and this was part of the section "Software Defined Transceivers for HF - Solved

Problem":

> On the high end of Software Defined transceivers for HF, in my opinion there's nothing else that's comparable to the Flex Radio 6000 series of HF radios and accessories. From the original SDR-1000, Flex Radio units were designed from the ground up to harness the power of external computers. When I finally decide to buy a high-end HF radio system, it will be a Flex Radio product, because Flex Radio is *all in* on Software Defined Radio technology like Tesla is all in on battery electric vehicles. (The comparison is *not* casual.)
>
> …
>
> However, on VHF and UHF, there is nothing (I'm aware of) resembling the Flex Radio 6000 series, or even the RadioBerry.
>
> In the original version of this article, I *was* going make light of the suggestion from a friend to use a >$3000 Flex 6000 series radio as a NPNAR - "just add transverters" (yuk yuk). But, after watching one of the presentations of the QSO Today Virtual Ham Expo with Flex Radio's Chief Technical Officer (CTO) Steve Hicks N5AC, it became obvious that "just add transverters" isn't a casual add on. The use of transverters with the Flex 6000 series is a carefully considered integral feature of the Flex 6000 series.
> …

I'm already a fan of FlexRadio products. They *get* this brave new world of Software Defined Radio technology, as in start with ample computer power, apply software, then add radio hardware *as necessary*. Whenever possible, push functions into software. While you're at it, the hardware might as well look nice.

Now (conceptually) add a Q5 Signal 5BVUXHP 5-Band High Power VHF/UHF Transverter to, say, a FLEX-6400M. (I chose the "high power" option instead of the lower power version WA7FUS mentioned.) With the software support for transverters built into FlexRadio units, and this transverter, you have pretty much the ultimate Software Defined Transceiver including the (more) interesting (to me) Amateur Radio VHF / UHF bands. As in *all* of them:

- "144" (presumably 144 - 148 MHz) - 50 watts TX
- "222" (presumably 222 - 225 MHz) - 50 watts TX
- "432" (presumably 432 - 450 MHz) - 50 watts TX
- "902" (presumably 902 - 928 MHz) - 50 watts TX
- "1296" (presumably 1240 - 1300 MHz) - 20 watts TX

Software defined means this radio can operate *whatever* mode - SSB, FM, AM, CW, and future digital modes (enabled by future software updates). I'm not aware of a comparable system (yet) of the usability of a FlexRadio 6000 series combined with the Q5 Signal 5BVUXHP. I want to run a lot of "sound card modes" on multiple VHF / UHF bands, and this combination looks like

a good platform for doing so.

To those who point out that FlexRadio software (and hardware) isn't Open Source, point taken. I, personally, am not an absolutist about Open Source. Where it's feasible, I'm for it. One example is my advocacy of VARA FM as the "best we can do on VHF / UHF 20 / 25 kHz channels at the moment" as there's nothing comparable available in an Open Source implementation. Another is that I use a Mac as my primary computer instead of Linux because I value the stability, support, and "just get work *done*" usability of a Mac (such as writing Zero Retries).

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goTenna Mesh Networking Products

In Zero Retries 0031 I discussed **Text Messaging on Motorola Solutions Talkabout T800 GMRS Portable Radio**. I didn't have room there, or since, to mention GoTenna's products which have a similar off-network text messaging capability to the Motorola Talkabout T800 GMRS portable radios.

goTenna Mesh is the consumer version and uses the license-exempt 902-928 MHz band in the US. Between the use of 902-928 MHz and the lack of a whip antenna, I wouldn't put much stock in their range projections.

The goTenna Pro X might be a bit more interesting to Amateur Radio Operators:

The world's smallest, lightest, most cost-effective tactical mesh networking device pairs with our native iOS/Android mobile application as well as third-party apps like ATAK to enable off-grid communications.
…
goTenna Pro X is designed for professional use, and offers user-selectable frequencies in the VHF (142 - 175MHz) and UHF (445 - 480MHz) bands. These

> frequencies require an FCC Part 90 license to operate in the United States.

Perhaps goTenna's lawyers or copy writers need a refresher of the US Spectrum allocations for 144-148 MHz and 445-450 MHz? Not to mention that GMRS uses frequencies at 462 and 467 MHz.

It's good to see that (unlike the goTenna Mesh) the goTenna Pro X has a real antenna.

I'm not quite sure what to make of this network map associated with the goTenna Pro X - https://imeshyou.gotennamesh.com

Bookmarked for further study one of these days.

SuperPacket / Zero Retries 2022 "Interesting" Events

There are a lot of "Zero Retries Interesting" events occurring in 2022 **(Yay!)**, and instead of reporting them piecemeal here in Zero Retries, I spent a couple of hours putting together a web page on my SuperPacket blog - SuperPacket / Zero Retries 2022 "Interesting" Events. Inclusion of an event on that page is totally subjective on my part, so if you know of an interesting event, let me know in comments.
March events:

- 2022-03-12 and 13 - Virtual - QSO Today Virtual Ham Expo
- 2022-03-18 and 19 - Huntsville, Alabama, USA - HamSCI Workshop 2022: The Weather Connection
- 2022-03-26 - Sandy, Utah, USA - Utah Digital Communications Conference (Utah DCC)

ZR > BEACON

- Funny, or *Uh Oh…*
- ARRL Announces New World Wide Digital Contest

> 2022-02-09 - The ARRL International Digital Contest will debut at 1800 UTC on June 4, ending at 2359 on June 5, 2022. All non-RTTY modes are permitted. Going forward, RTTY will be the sole mode for the ARRL RTTY Roundup, which will continue to take place in January.
> In broad strokes, this will be an HF – 6-meter event, on 160, 80, 40, 20, 15, 10, and 6 meters, with single-operator and multi-single entry categories. These are Single Operator, One Radio (SO1R), Single Operator, Two Radio (SO2R), and Multi-Single (MS). Overlays in the single-operator categories will include "all enclosed antennas" and "maximum of 8 operating hours." Single-operator entries may operate for 24 hours (with off times taken in one or two breaks that are at least 60 minutes long), while MS entries may operate for the full 30 hours.

See the link for additional details. Well, this is cool! I recently tried HF data modes during Winter Field Day and I wasn't nearly as savvy at it as I thought I would be. This will be a good excuse to get my "new" Kenwood TS-130SE HF radio set up and on the air.

Updata

- In Updata in Zero Retries 0030 I wrote:

  > **Credit where due - Inductive Twig** (Re: Zero Retries 0028) Five days before I would have initiated a claim with my credit card issuer for non-delivery and non-communication after my order on 2021-12-30, Inductive Twig claims to have shipped my items. Still no direct communication from them, just the shipping notice. Per their web page, their business shutdown may have been chaotic ("skeleton crew"), but they've done their part for Amateur Radio by posting some open source documentation on Github, including hardware data for HamShield 1.0.

  The coda to this is that I received part of my order (the inexpensive HamShield Minis) but the more expensive items are still shown as "Label created" with no movement to actually ship the items to me. Thus I've initiated my chargeback with my credit card issuer. To me that was a sad postscript to a company that had a lot of promise, and it will tarnish the reputations of the principals of Inductive Twig / Enhanced Radio Devices. The *least* they could have done would have been to reply to my emails (which don't bounce, so they're apparently arriving somewhere).

Feedback Loop

- **ReadyKilowatt on ZR 0033:** … *If we're starting with a blank sheet protocol, it would be nice to include T/R frequency and geolocation data (6 character maidenhead grid square would probably be sufficient) so that user nodes could have the option of QSY on the fly without having to manually retune and re-establish. In other words, a roaming protocol but with the radio having some say in the handoff. While we're dreaming, signal quality feedback when in a duplex QSO from the receiver so the radio might increase power or try another node.*

  ReadyKilowatt: Good points! One of my unstated assumptions is that since they're so inexpensive these days, each node would include a GPS receiver, not just for location but also for an accurate clock.

- **Bill Dornbush AA6BD on ZR 0033:** *I tried to comment using the link in Zero Retries 0033 only to be taken to Zero Retries 0016 but I found I could alter the URL to get here. You suggested using VARA-FM and Raspberry Pi's but VARA-FM only works on Windows, so cannot be used - yet - on a Raspberry Pi. You did suggest using Pi's for routers and Nodes but what is a Node? I have a Pi working using the great Build-a-Pi package which includes PAT for Winlink, and YAAC for APRS. This package makes it*

easy to get Winlink and APRS working using DireWolf and AX.25 on 2M, and also includes FLdigi and more. I have a Yaesu FT-8900 which includes FM 10M and 6M in addition to 2M and 440, and a flat audio interface. I believe there is a clone of this radio available, TYT TH-9800D, so that could be another choice for 6M FM. I also have an Icom IC-7100 which provides a flat audio interface so I assume it would also work on 6M, so there are several possible radios. Thanks for producing Zero Retries. I have really enjoyed reading it and thinking about the many possibilities you present.

Bill - Thanks for mentioning the issue in the comment button. That's now fixed. Yes, if we use VARA FM in the near term, it will need to be running on its own Windows computer. It looks conceptually possible to use VARA FM as "transport" with a routing software on a Raspberry Pi computer. Eventually there will be something equivalent to the performance of VARA FM that will run on a Raspberry Pi along with all the other software. "Node" is my mental shortcut for a standalone system not at an individual's home. Thanks for the pointer to the Yaesu FT-8900 as another choice for 50-54 MHz. My fantasy is that from observing the many, many HF radios that have been designed in the last few years, someone could come up with a design for a 50-54 MHz data radio (flat audio interface) that could have the option of high power. But yes, we can get started with existing 50-54 MHz radios.

Join the *Fun* on Amateur Radio

If you're not yet licensed as an Amateur Radio Operator, and would like to join the fun by *literally having a license to experiment with radio technology*, here are some pointers:

- **Ham Radio for Dummies** by Ward Silver N0AX is a great overview of Amateur Radio. N0AX is a gifted writer and HRFD is now in its 4th edition.
- My two favorite **YouTube** channels for a good overview of Amateur Radio are AmateurLogic.TV. and Ham Nation (part of Ham Radio Crash Course). These folks just seem to have so much fun!
- Radio Amateur Training Planning and Activities Committee (**RATPAC**) offers weekly presentations on general Amateur Radio topics (Wednesdays) and emergency communications in Amateur Radio (Thursdays).
- Dan Romanchik KB6NU offers a free **No-Nonsense Study Guide** for the Technician test (PDF).
- HamExam.org Amateur Radio Practice Exams offers good **Flash Card and Practice Exams**.
- When you're ready to take an **Amateur Radio examination** (Tech, General, or Extra), W1MX - The MIT Amateur Radio Society offers remote exams, free for students and youngsters. *There are apparently many other remote exam options*.

Bonus - with an Amateur Radio license, you'll be more attractive on dates 😀

Closing the Channel

- In its mission to grow Amateur Radio and make it more relevant to society in the 2020s and beyond, Zero Retries is published via email and web, and is available to anyone at no cost. Zero Retries is proud *not to participate* in the Amateur Radio Publishing Industrial Complex!

- My ongoing Thanks to Tina Stroh KD7WSF for, well, *everything* and Bill Vodall W7NWP as *Zero Retries Instigator in Chief*.

- My ongoing Thanks to pseudostaffers Dan Romanchik KB6NU and Jeff Davis KE9V for continuing to spot, and write about "Zero Retries Interesting" type items, on their respective blogs, from Amateur Radio and beyond, that I don't spot on my own.

- Southgate Amateur Radio News consistently surfaces "Zero Retries Interesting" stories.

- The Substack email publishing platform makes Zero Retries possible. I recommend it for publishing newsletters.

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All previous issues of Zero Retries are available without restriction (no paywalls). For some

background, Zero Retries 0000 was the **Introduction Issue**. Zero Retries 0026 and Zero Retries 0027 were a **2021 Year End Review** of Zero Retries.

More bits from Steve Stroh N8GNJ:

- SuperPacket blog - *Discussing new generations of Amateur Radio Data Communications - beyond Packet Radio (a precursor to Zero Retries)*
- N8GNJ blog - *Amateur Radio Station N8GNJ and the mad science experiments at N8GNJ Labs - Bellingham, Washington, USA*

Thanks for reading!
Steve Stroh N8GNJ (He / Him)
These bits were handcrafted in beautiful Bellingham, Washington, USA
2022-02-25

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